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Editor, WIRED:

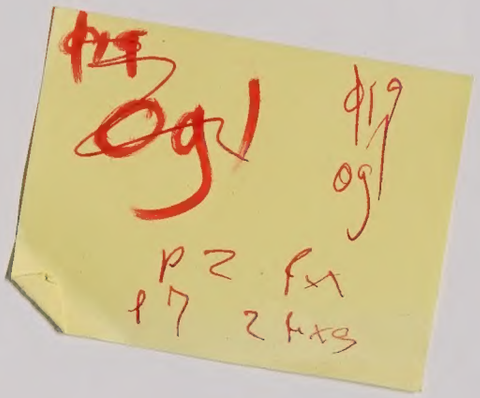
"When handed a lemon, make lemonade" is a good motto, but "If it's yellow, make lemonade" is not. What then is the reader to make of this yellow journalism by Gary Wolf? Evocatively written and cunningly constructed, the piece claims to be the final obituary of Project Xanadu; but some might imagine that it was intended to harm the reputations of all the Xanadu veterans and alumni (some fifty of us), and particularly my own, charging falsely (amid a fusillade of personal slurs) that my early work on media design and hypertext were based on technical "ignorance" and "fantasy."

Wolf's sloppy technical descriptions might be fine in an op-ed piece, but this purports to be a history. With so many reputations dangling from his fingertips, Wolf owes it to his victims, and to the intelligence of WIRED readers, correctly to represent the facts of history and what we have been endeavoring to do.

My colleagues take these charges with utmost seriousness and so do I. Other fellow members of that now-disbanded group, my friends and colleagues of what was then Project Xanadu, have asked me to be their spokesman one last time. So I shall speak not just for myself, but for all those that Gary Wolf has smeared.

In the pretense of objectivity, and with major error of fact, Wolf has wasted a great deal of space on the endgame of XOC's corporate politics at Autodesk. But he has utterly misrepresented the stated intentions of our work and our claims about it, apparently just to make us look bad, and he has deceitfully maligned my own competence, denying in both explicit and indirect ways that I ever understood what I was doing. To all this I must reply.

I will deal here only with damaging, substantive, factual misrepresentations which



are either malicious or negligent, and therefore meet the definition of libel.

Wolf's article is a very nasty piece of work. Nastiness breathes from the commas, drips like Spanish moss from Wolf's fine sentences. Everything in the piece is contrived to promote disapproval rather than understanding. This hatchet job could be a textbook for a course in persuasive writing: seemingly every word, every detail has been chosen for its connotations of folly, decay and despair, rather than its accuracy or appropriateness.

The inaccuracies of the article begin in Sentence One (there is no Marin Boulevard in Sausalito), but I will not chronicle them here; a partial list will be found after June 8 at http://xanadu.net/wolfsbane.

1. UNDERCUTTING THE TRADEMARK

Reports of Xanadu's death have been greatly exaggerated, especially by Mr. Wolf. Nowhere did Wolf mention that "Xanadu" is once again my own living trademark, now registered and completely divorced from the software he takes such pains to disparage and misrepresent. This is a negligent, damaging omission of fact. (Did Wolf miss the fast-breaking news? No, the name changed its meaning two and a half years ago.) If that software is not finished, I will find another way to achieve transclusive literature, and do it under the classical Xanadu trademark.

2. WOLF'S CLAIM THAT XANADU COULDN'T BE DONE

Wolf makes a big, fat technical claim that sure makes us look stupid.

> *Even today, the technology to implement a worldwide Xanadu network does not exist.*

Why, how silly of us not to notice-- well DANG!-- how could we have missed it? (Strong vapors indeed must I have exhaled, to have intoxicated such able mathematician-generalists as Roger Gregory, Mark Miller and K. Eric Drexler, superprogrammer/superbusinessman John Walker, and the rest of Autodesk management.)

But just what is it that can't be done yet? Instead of stating what it is that he believes impossible, Wolf does a fan-dance of hints calculated to give an incorrect impression of our design and plans.

For instance, he implies that we had some plan to analyze or represent contents of

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https://archive.org/details/editorwired00tedn

documents:

> *... [The] colleagues were trying to build a universal library on machines that could barely manage to edit and search a book's worth of text.*

Excuse me, but we were never searching text; we were not analyzing or representing contents in any way. (But contrary to Wolf's assertion, you can ***edit*** large bodies of material with only small parts in memory at once; it's called pointer manipulation, and that's what we were doing.)

> *No matter how powerful their machines, or how elegant their code, there had always been too much data to move in and out of memory.*

I should think so! Gee, maybe that approach won't work! Maybe we should just point at the data, rather than moving it in and out of memory. Welcome to Xanadu.

To be sure, WOLF'S "Xanadu" (-- a vast system revealed coyly, only in scraps) could not have been done, but that's because he wants it that way. He is quite right that the Xanadu he describes vaguely and nonchalantly could not have been done, apparently representing the contents of all books and sending them out in torrents.

But some type of Xanadu design was always doable, with the technology of any era since I started in 1960. That is because "Xanadu" has always referred to a specific data service of documents, versions, links and transclusions-- ***at whatever speed***.

The XOC Xanadu server that Wolf misrepresents is simply a readdressing box. Basically it translates address positions among virtual documents, versions, links and transclusions, across a distributed, expandable address space of contents. The Xanadu readdressing box is designed to hand over the addresses of the final desired pieces to the user's front-end machine, which can then send for the pieces and show them, composited into virtual documents, showing also their interconnections and outreaching connections to other materials. (The user's front-end machine is thus rather like Mosaic and Netscape, which I believe were based on our work.)

Actual delivery of the pieces is obviously a problem of a different kind, a bandwidth problem, subject to more conventional engineering and computer science. The issue we addressed was addressing itself-- virtual addressing in a hypermedia world where everything can be re-used and recomposited. Have others even recognized this problem?

The proposed publishing system simply points this addressing system at a stable repository of committed publications, and adds a legal and business arrangement. (The rightsholders of these documents must agree to out-of-context sale and repositioning, a form of permission that I am now calling "transcopyright.")

The glory of the Gregory-Miller vision, and the Drexler engine design of 1981 (built into the software Wolf describes), is that they put everything into a uniform space with a uniform address mathematics, subject to sweeping methods. But whether the engine can scale up to the performance we hoped, we could not know. We could only hope-- for reasons that were reported in *Literary Machines*. I believe I took pains at all times to state that these were conjectures based on the team's best analysis.

But if it didn't scale up, that would by no means be the end of the Xanadu story, of transclusive media or transclusive literature; just the end of that particular fine-grained approach.

3. TRANSCLUSION MISSTATED

Wolf has seriously garbled the idea of transclusion:

> *The idea of quoting without copying was called transclusion, and it was the heart of Xanadu's most innovative commercial feature - a royalty and copyright scheme. Whenever an author wished to quote, he or she would use transclusion to "virtually include" the passage in his or her own document.* [Correct.]
>
> ...
>
> *The key to the Xanadu copyright and royalty scheme was that literal copying was forbidden in the Xanadu system. When a user wanted to quote a portion of document, that portion was transcluded. With transclusion, no actual copy was made, and every quote was really a pointer to the original document. Xanadu's transclusion feature ensured that the system would always trace an individual work when it was being read or quoted, allowing authors to charge a small fee for every reading.*
>
> *Transclusion was extremely challenging to the programmers, for it meant that there could be no redundancy in the grand Xanadu library. Every text could exist only as an original. Every user in the world would have to have instant access to the same underlying collection of documents.*

This has it all wrong. To say we planned to have only one copy of anything on the network is ridiculous. There have to be copies-- actually instances-- throughout the network and in the user's machine. Therefore a key problem is how to resolve these many instances into a single virtual object, not troubling the user about their different locations. (Note the problems caused on World Wide Web by making no distinction between a document's identity and its address. The result is "mirror sites," etc.) Literal copying is not forbidden in a global Xanadu scheme, it is *essential*; but each copy retains its original identity and ownership, as a remote instance. That is the point. The different copies have to be functionally united into one logical identity.

Transclusion is *not just for publishing*, as Wolf implies. Transclusion means making and maintaining connections among things which are the same-- not just among published documents, but privately as well. There are a variety of reasons to want to do this, including intercomparison, cross-filing, the consideration of alternatives and distributed update, as well as the publishing system mentioned.

Finally, transclusive republication did not mean the system would "trace an individual work when it was being read or quoted," which implies spying on the user. Rather, sale transactions for the requested portions will leave no trace of who bought the pieces-- that would make reading political. But the purchaser will be able to prove he or she bought the pieces.

Nor will "authors charge a small fee for reading." The transaction will be the actual purchase of an electronic copy of each chunk of data; the user then owns that copy. (And may in turn republish it anywhere, virtually, through transcopyright.)

4. ENFILADICS MISREPRESENTED

With regard to enfilade technology, Wolf willfully ignores our exact and careful distinctions in order to make our intentions and claims appear ridiculous.

> *He [Nelson] believed that the newest versions of the data-search algorithms, dubbed "General Enfilade Theory," allowed the Xanadu system to grow forever without its performance degrading unacceptably. Most computer scientists would have been suspicious of these claims, but this hardly bothered these programmers, who were working in an atmosphere of friendly competition and camaraderie. They may not have always agreed with Nelson's aggressively optimistic predictions, ...*

Excuse me, but (as I stated in my book *Literary Machines*, where I was reporting on the group's work and design), it was their optimistic predictions that I was endeavoring to report exactly. And excuse me, but of course we knew that "most computer scientists" would have been suspicious of these claims, but we happened to be computer scientists too-- notwithstanding Wolf's repeated snide imputations to the contrary-- doing fundamental research at the front line. I reported our claims to Donald Knuth, the world expert on algorithms, and he was kind enough to acknowledge them publicly, so a dialogue was underway, though hampered (as is common in industry) by issues of trade secret.

Wolf quite ignores the attribution of General Enfilade Theory to Mark Miller, Stuart Greene and Roger Gregory, and he totally omits the contribution of K. Eric Drexler, the unifying search engine which is a single crystal perched atop the other work. (Perhaps he does not mention it because everyone *acknowledges* that Drexler is a scientist.)

Wolf incorrectly states our main hope, which was that the shape of the degradation curve as size increased could be outweighed by anticipated improvements in hardware.

Our public statements about enfilades were only place-markers so that we could explain what we were trying to do in general, and so that people could think with us on the issues of media design. The purpose of bringing up enfilades at all was certainly not to attempt to wangle credit for unrevealed methods, but to invite people to consider the proposed medium of transclusive electronic publishing.

I regret that so much has been misread into this, and that enfilade technology remains still under nondisclosure-- not to me personally, as Wolf states:

> *When asked skeptically why he won't allow anything about the invention to be published, Nelson responded with quick anger. ..*

-- but, as is ordinary practice in industry, these matters are still proprietary to XOC, Inc., and its licensee Filoli, Inc. (formerly Memex, Inc.). Regrettably, the nondisclosure agreement also applies to showing where others have discovered some of these things independently. I would like it if some generalist of algorithms, like Donald Knuth, would function as a trustworthy third party simply to examine our original 1970 work under nondisclosure and verify in a public statement the novelty of the work for that time, and how long that particular work took thereafter to get into the published literature. To the best of our knowledge it was well over a decade, and we have no seen no indication that the later work has been replicated. But of course that may have already happened anywhere. It could be in so many forms of representation or expression that for

it to be recognizable as the same work is itself a formidable problem, as mathematical historians well know; and it could be strewn about in pieces. Or all derivable in some way nobody knows from Kantor, Lie or who knows who. I look forward to the time that these swirling ideas can join the mainstream of published technical literature.

THE TREATMENT OF ROGER GREGORY

Wolf's treatment of my friend and colleague Roger Gregory, who is a private person and thus entitled to a measury of privacy and decency of treatment, subtranscends nastiness to define a new low of slimy journalism. But as to seemingly factual aspects of the treatment of Roger Gregory, Wolf endeavors to represent him as an ignorant computer repairman, in over his depth.

> *"... he was not a computer scientist or an elite researcher..."*

Yet a few paragraphs later, Wolf mentions that Gregory had studied transfinite numbers, and (with Mark Miller) invented a new form of addressing based on them. Is this computer science or not? I think so! And I challenge Mr. Wolf to define computer science in a way that it is not.

By the word "elite" in "elite researcher," Mr. Wolf seems to mean "anointed." And it is true that we were not among those licensed by MIT and Xerox PARC to float above the sidewalk. But what we were doing was the real thing.

THE CHARGE OF MY "IGNORANCE"

I cannot help but see the heart of the article as an endeavor by Wolf to destroy any claim I might have to genuine understanding or foresight, saying rather that my work was based on "ignorance" and "fantasy:"

> *Had Nelson been able to delve into the technical reasons for which computer people found his plans for Xanadu unconvincing, he might have been too discouraged to continue. The kinds of programs he was talking about required enormous memory and processing power. Even today, the technology to implement a worldwide Xanadu network does not exist. Back in the '70s, when Nelson was still waging the first phase of his campaign, even simple word-processing programs required users to share time on large mainframe computers. The notion of a worldwide network of billions of quickly accessible and interlinked documents was absurd, and only Nelson's ignorance of advanced software permitted him to pursue this fantasy. The inventor was like a vaudeville performer practicing an acrobatic routine on the edge of an unseen cliff. A look into*

the abyss would doubtless have sent him tumbling.

These charges are sweeping, grave and final. This is a full frontal accusation in front of my whole tribe, and I must take it with utmost seriousness.

In my life I have as yet no real achievements, but I do have a peculiar distinction: a history of thirtyfive years in pursuit of a transclusive hypermedia ideal. Therefore this paragraph looks very much like an attempted career assassination, as I think Wolf intends it to be.

Oh, it's a slippery charge, stated most carefully, but the meaning is entirely clear. He says that I didn't know what I was doing, and that there was no basis for my ideas; that my delirious gibbering, driven by vapors, delusion and mirage, accidentally gave the impression of vision and foresight; that my beliefs and assertions were without understanding and for no good reason; that my work was based not on prescience but on mis-imprescience; and that I could not have possibly been right, since I didn't know enough to be wrong!

Let's look at the central accusation again.

> *The notion of a worldwide network of billions of quickly accessible and interlinked documents was absurd, and only Nelson's ignorance of advanced software permitted him to pursue this fantasy.*

Sheer poetry! In this extraordinary piece of linguistic craftsmanship, Wolf has done the seemingly impossible: making a grave charge, extremely damaging in its purport, conjoining the words "absurd," "ignorance" and "fantasy" in reference to the core of my early work, striking to kill; yet strangely, mystically contradictory.

Let me see if I've got it straight. According to Wolf, it was right to be wrong and I was wrong to be right, because everybody else knew better. Huh? Perhaps Mr. Wolf could tell me in what year it became politically correct to hold such ideas? Am I like the "premature antifascists" attacked in the McCarthy era, for having known too soon what others did not acknowledge till later?

First they call me crazy for predicting world-wide electronic publishing, now Wolf calls me "ignorant" for having been right! You can't win. Perhaps Mr. Wolf would list what would have been the ***correct*** prerequisites for these insights. --But no, the people who supposedly knew better were wrong, right? According to Wolf, that must have been a time when it was simply to early to know.

But let's take the only example he gives of my alleged "ignorance," my 1965 ACM presentation.

> *The inventor's original hypertext design predicted most of the essential components of today's hypertext systems. Nonetheless, his talk to the Association for Computing Machinery had little impact. There was a brief burst of interest in this strange researcher, but although his ideas were intriguing, Nelson lacked the technical knowledge to prove that it was possible to build the system he envisioned.*

A most interesting allegation.

Now let me quote from the actual paper, as published in the proceedings. The astute reader may note the luminous irrelevance of this accusation of "lack of technical knowledge" to what the paper actually says.

> (From "A File Structure for the Complex, the Changing and the Indeterminate," *Proceedings of the ACM Twentieth National Conference*, 1965. My apologies for the pronouns of those days, which are now considered "sexist," but I want these quotations to appear here with their exact original wordings and punctuation.)
>
> The kinds of file structures required if we are to use the computer for personal files and as an adjunct to creativity are wholly different in character from those customary in business and scientific data processing. They need to provide the capacity for intricate and idiosyncratic arrangements, total modifiability, undecided alternatives, and thorough internal documentation.
>
> ...But there are so many possible specific functions that the mind reels. These uses and considerations become so complex that the only answer is a simple and generalized building-block structure, user-oriented and wholly general-purpose.
>
> ... the file system that would have every feature a novelist or absent-minded professor could want, holding everything he wanted in just the complicated way he wanted it held, and handling notes and manuscripts in as subtle and complex ways as he wanted them handled.
>
> The costs are now down considerably. A small computer with mass memory and video-type display now costs $37,000...
>
> ... Despite changing economies, it is fashionably believed that

computers are possessed only by huge organizations to be used only for vast corporate tasks or intricate scientific calculations. As long as people think that, machines will be brutes and not friends, bureaucrats and not helpmeets. But since (as I will indicate) computers could do the dirty work of personal file and text handling, and do it with richness and subtlety beyond anything we know, there ought to be a sense of need. ...

... the system must be able to hold several-- in fact, many-- different versions of the same sets of materials. Moreover, these alternate versions would remain indexed to one another, so that however he might have changed their sequences, the user could compare their equivalent parts. [This has always been central to my designs.]

...

Let me introduce the word "hypertext" to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper. [I have since changed my preferred definition to "nonsequential writing with free user movement," thus broadening the idea to include footnotes and marginalia, but ruling out most computer-assisted instruction and adventure games.]

...

This paper has proposed a different kind of structure for handling information.

Essentially it is a file with certain storage provisions which, combined, permit the file's contents to be arranged any-which-way, and in any number of ways at once. A set of manipulation functions permits making changes or keeping track of developments. The file is capable of maintaining many different arrangements at the same time, many of which may be dormant.

...

Despite this file's adaptability to complex purposes, it has the advantage of being conceptually very simple. Its structure is complete, closed, and unified as a concept. This is its psychological virtue. Its use can be easily taught to people who do not understand computers. ...

I invite the reader to "delve," searching the full paper in detail for any "lack of technical knowledge," indeed for the slightest possible ground for Mr. Wolf's statement, for any scintilla of a technically implausible suggestion that needed "proof." The reader may not ***like*** my design, or may question its appropriateness for the creative processes I was discussing, but that is entirely another matter.

The requisite technology for zipper lists was relatively simple. Readers wishing to experiment with the current Unix implementation of the file structure, with no

interface, can get the Tcl file code from the Sapporo HyperLab. It is just as straightforward as I said it would be thirty years ago. (The author of the code, a fine programmer who will here be called Mr. Okidoki, considers it too simple to have his name associated with it).

OTHER CHARGES

> *The kinds of programs he was talking about required enormous memory and processing power.*

Excuse me, but the programs I designed from 1960 to 1972, ***all feasible***, were designed for the smallest machines of those days. Zipper lists, above, are only one example.

WOLF'S RESOURCES AND HONESTY

Wolf could easily have looked into my "lack of technical knowledge" and "ignorance of advanced software:" a number of the people that he interviewed could have testified to the contrary. There is an interesting bit of evidence in a recent book called *Nano*, by Ed Regis. Or Wolf could have looked at my other early publications, which were more academic in style, and quite footnoted, before I despaired of achieving anything through academic channels. Or, had he asked, I would have shown him the upcoming summary of my work in the August 1995 *Communications of the Association for Computing Machinery.*

I will not enumerate the hundreds of avenues I pursued and development threads that I watched. I will not here enumerate my studies of the 1960s, nor the tutors who helped me from coast to coast, except for one group. I must speak for the R.E.S.I.S.T.O.R.S., those highschool kids who advised me, as Wolf relates so snidely.

Margy Levine, Jordan Young, Steve Emmerich, Steve Ludlum, Carol Baroudi and John Levine are computer professionals and consultants. *Unix for Dummies*, and the phenomenally successful *Internet for Dummies* series, with sales in the millions, was written by former R.E.S.I.S.T.O.R.S., Margy Levine, Carol Baroudi and especially John Levine. Lest John be thought a mere popularizer, he also edits and publishes the *Journal of C Language Translation.* Peter Eichenberger is vice-president for engineering of Chronologic, providing IC design software. (It will be noted that IC design software is at the intersection of compilation and simulation at various levels, from software to physics; a most serious area.) The brilliantly eloquent Lauren Sarno has held various computer

jobs and edited the current edition of my book *Literary Machines*. Alas, Nathaniel Kuhn, the black sheep, has forsaken computers, first to get a Ph.D. in mathematics and more recently to go to med school.

They are high-power now and they were high-power then.

Perhaps Mr. Wolf's is the "inability to delve;" but I am afraid it is worse than that. Given the intellectual resources available to Mr. Wolf, and the unmitigated ferocity of his sweeping attack, it is hard for me to imagine that he was endeavoring to be honest. He seems to have gotten carried away with some other agenda he thought was more important than honesty.

A DIFFERENT PARADIGM

Perhaps (to be the most charitable), Mr. Wolf has talked to people who thought I "didn't understand computers" because I wanted things to be a very different way, and still do; another person's behavior may seem like ignorance, confusion or insanity when that person is simply living in another paradigm. But from the beginning of this work in 1960, proceeding from a basic understanding of how things were in the computer world, I have wanted them to be very different, and worked fiercely toward that goal.

Some "library of the the future" people of the sixties, who wanted to analyze and represent content, thought I was ignorant because I was talking in a new way at THEIR conferences, and they thought me to be deliriously transgressing on their subject. But I was talking about a different paradigm.

And of course those johnny-come-latelies, Xerox PARC and the Media Lab <ggl>, have treated me as ignorant because my detailed designs and hopes for the media future have almost nothing to do with theirs.

My ideas may have been too startling and sweeping for many people, but if my hearers from the sixties and seventies will examine what I actually said, rather than what they thought they heard, I think they will be very surprised.

I realize now that most people heard only every other word at best. They heard the thrust and intensity of my vision, but not my exact words; what they heard was based on their perconceptions, preoccupations and then-current levels of awareness. And of course some were so eager to mishear and put me down that they would mishear and misremember no matter what.

My detractors, of whom Wolf has made himself the spokesperson, need to think of me as an uncomprehending, noisy parasite, need to mishear me, need to think I

did not and do not understand, because they cannot countenance the alternative: that I may have known something then that they did not, and consequently still might.

I continue to hold exactly to my original vision of 1960, that transclusive hypermedia-- will be the publishing medium of the future, under whatever brand name.

There are far more varieties of interactive media than anyone has yet tried out; but I believe that open transmedia-- unique in power to aid understanding and solve the copyright issue-- represent a vital singularity in the great family of media cosmologies; and until this is disproven, I continue to stake my life and career on it. If I am right about the centrality of transclusion to the media of the future, it may all have been worth it, and we will see who understood media design after all.

A MODEST DEMAND

One more time.

> *The notion of a worldwide network of billions of quickly accessible and interlinked documents was absurd, and only Nelson's ignorance of advanced software permitted him to pursue this fantasy.*

The ferocity and harsh intent of Wolf's statement, and his varied and repeated assertions of my incompetence and ignorance, however strange or contorted the charges, require that the magazine back up these accusations.

I demand that Mr. Wolf, and the editors and publishers of WIRED, translate these accusations into a specific and testable set of charges concerning, and material to, the grounding and validity of my work, ideas and predictions in the 1960s and 1970s.

(Let us stick with my work of the sixties and seventies, where he centers these charges, in order to keep them separate the charge from the "enfilade" business, which may not be settled publicly for years. Clearly the total vindication of my computer work must wait till then.)

Meanwhile, I demand that Mr. Wolf, and the editor and publishers of WIRED, restate their charges as a testable bill of particulars, open to

the judgment of its readership, regarding my "inability to delve," "ignorance of advanced software," "lack of technical knowledge" and "absurd notions;" insofar as they may have been material to the clarity, lucidity, grounding and validity of my work, ideas and predictions in the 1960s and 1970s; identifying specifically any detectable technical errors, deficiencies, exaggerations, lacunae, false assumptions, misinterpretations, misunderstandings, shortcomings, fantasies, hallucinations and "absurd notions" as they may be able to exhume, anywhere in my designs, predictions, published articles, or recorded speeches; whether leading me to think the wrong thing, OR the right thing BY MISTAKE, as is so quaintly averred; so that such defects may be subject to public verification or disproof; so that we can settle clearly whether my ideas were free-floating delirium or sound conjecture; whether my continual pursuits of hypermedia represented a "fantasy" of "ignorance" or a clear deliberate search among possibilities and alternatives to substruct my media designs; and WHETHER I WAS RIGHT FOR SOME WRONG REASONS OR WHETHER I WAS RIGHT, PERIOD; so that the degree of damage from these remarkable corkscrew accusations can be properly assessed.

The general idea that we need freedom and availability of information to avoid disaster Mr. Wolf calls a "very hackerish assumption." Perhaps. But it is also an ideal I believe in very much, bound up with the ideals I learned when we pledged to the flag in grade school. And, ironically, that ideal seemed to be, I thought, what WIRED stood for. Mr. Wolf's piece is a perfect example of such a disaster: a disaster if not preventable, correctable by freedom and availability of information.

Wolf is himself indeed an innovator in electronic media. By combining the word processor and the poison pen he has created a new electronic literary genre all his own. But to quote him once more:

> *In books, television, and radio, the truth is a slave to a good story, and convincing lies are remembered while dry, factual refutations are forgotten.*

Indeed. Well, I say let us remember properly. That is the Xanadu ideal.

Theodor Holm Nelson